

Air Force

SBIR

Impact



Tool Design Software Creates Big Impact on Sheet Metal Forming

Company:

FEM Engineering, Inc.

Location:

Los Angeles,
California

Employees:

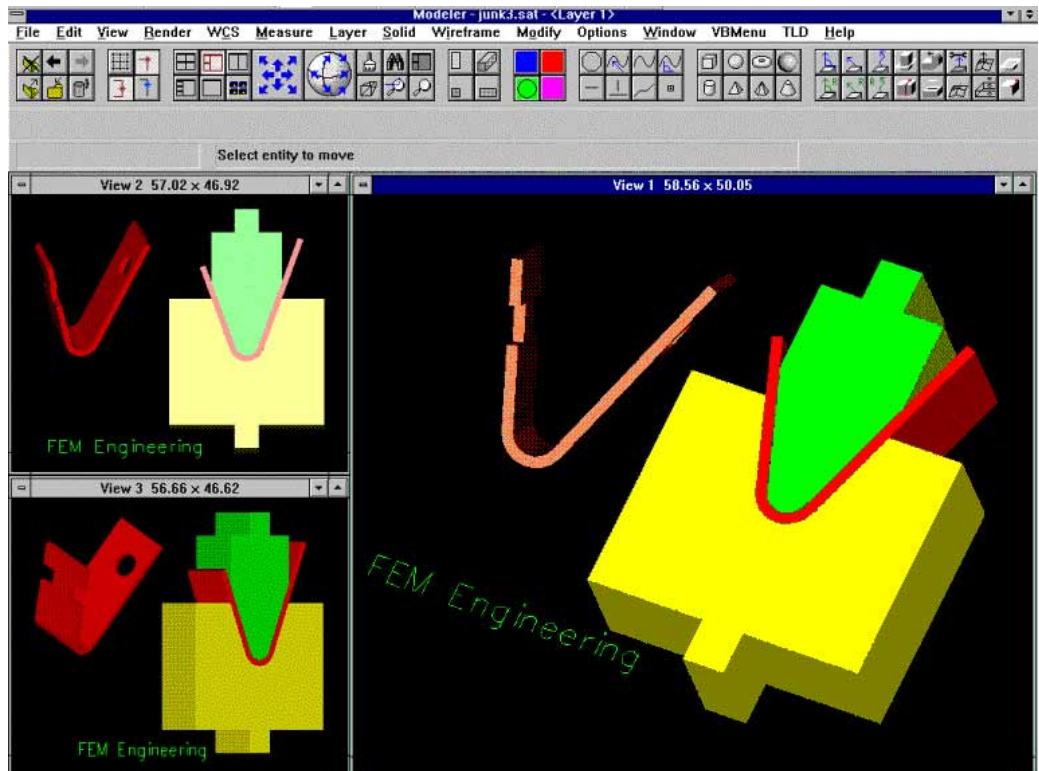
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President:

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Air Force Requirements:

A major portion of the Air Force budget is spent on the design, development and maintenance of aircraft. Many of the spare parts needed for the fleet are made out of sheet metal and formed mostly through hydroforming and stretchforming processes. Tool design and fabrication are crucial steps in manufacturing sheet metal parts. However, the design process itself is seen as a major obstacle for reducing the time and cost involved in producing parts. The Air Force had earlier supported development of an expert system to automate tool design for high quality, structural composite components. The new requirement was to develop a similar technology for the metal forming area.

SBIR Technology:

FEM Engineering, funded in part by SBIR contracts, developed Metal Forming Tool Design (MFTD) software that achieves a substantial reduction in tool design time for sheet metal forming with additional benefits of greater accuracy and consistency in tool design. The tooling knowledge encapsulated and performed by the system enables companies to maximize their tooling staff and have greater throughput. The MFTD software works in conjunction with Metal Forming Simulation (MFS) software. MFS software enables designers to

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determine the formability of a given part prior to manufacturing. The entire software package has been demonstrated to reduce cycle time over seventy-eight percent and labor by over fifty percent. Also, the rejection rate has been decreased by over ninety percent.

Company Impact:

On average, a car has around 2,500 sheet metal parts; an airplane around 10,000 parts and a ship has close to one million parts. The prototyping of each part, that is to design and develop the right tool and determine the optimum process, can take weeks and often months. The average cost of prototyping a part can range from \$5,000 to over \$100,000. Billions of dollars are spent annually on physical prototyping of sheet metal parts. It has been established that this technology can reduce the cost and time of the prototyping by over 50%. The tangible benefits are substantial for the military and the commercial sectors. FEM Engineering has already talked with several major American, Canadian and European aerospace companies about commercializing the MFTD software.

Company Quote:

"The Air Force SBIR program helped provide the funding support that led to development of the Metal Forming Tool Design software and other simulation packages, that together, as an integrated system, provides a breakthrough in the way sheet metal parts are manufactured. Without the funding we would not have been able to develop the software. We believe the software will enable us to establish a leadership role in the marketplace and will allow us to grow substantially in the next few years while creating over one hundred high paying jobs."

Ali Nezhad, Ph. D.
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